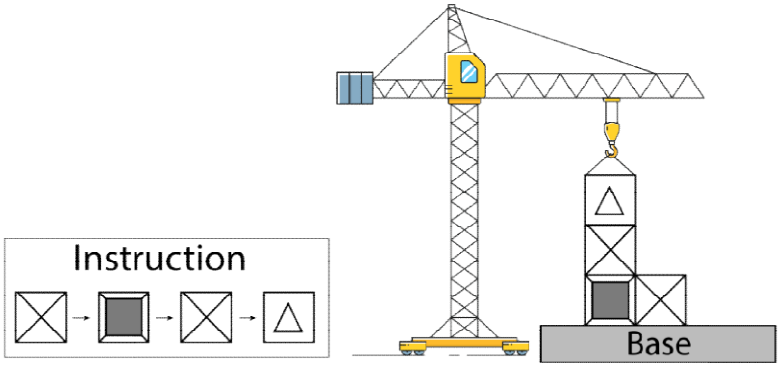
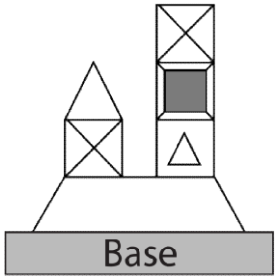
TASKS T1 – T7 CARRY 3 POINTS EACH

T1. BUILDING ORDER

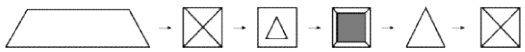
In Beaver land, block houses are built following instructions. A crane takes each block in order shown in the instruction and puts it on the base or on top of another block.
For example, a house shown could be built following the building instruction below:

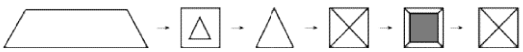


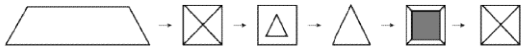
Question / Challenge

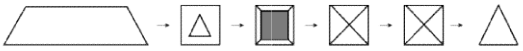


Which of the building instructions below **cannot** be used to build the house above?

A) 

B) 

C) 

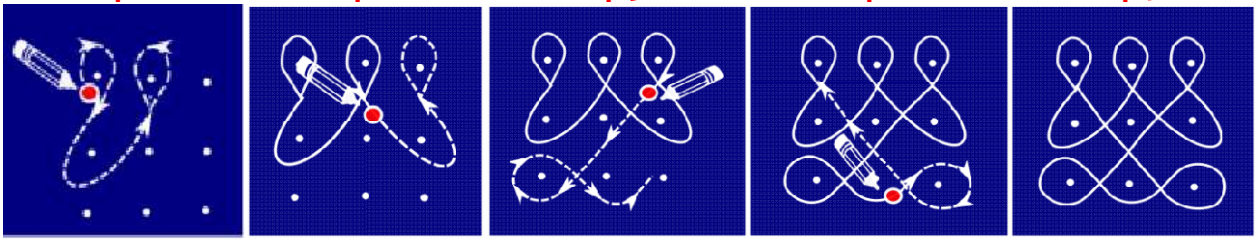
D) 

T2. LOOP KOLAM

Kolams are decorative patterns. You can draw Kolam on the floor with chalk.
First you place dots and then you draw lines around them.
You start and end at the same point by forming a continuous pattern, without lifting the chalk. Lines may cross each other, but you cannot draw sharp turns.

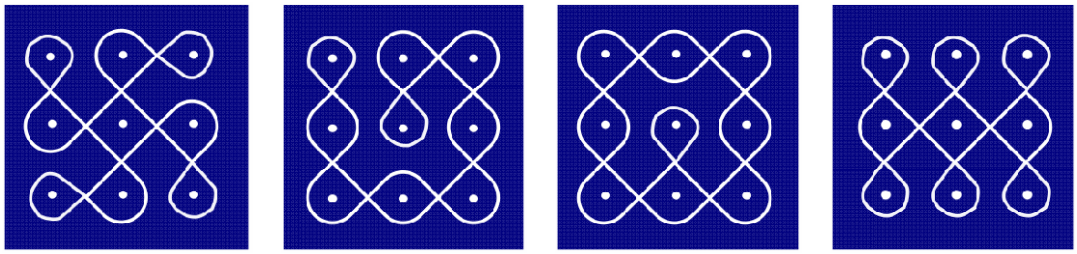
 The turn of this line is allowed.

 This turn would be a sharp turn, which is forbidden.



Question / Challenge

Which Kolam can you NOT draw this way?



A) B) C) D)

T3. BIRTHDAY PARTY

Little Beaver is planning a birthday party. He makes a to-do list with tasks to be done before the party. (shown below)

To-Do List	Making sure how many people are coming	Buying snacks	Picking a date	Estimating the cost	Choosing a Venue
Prerequisites for the task above	10	10	none		

He realizes he needs to complete some tasks before he can carry out other tasks. For example, before counting all the people that are coming, he needs to pick a date first.

Question / Challenge

Of the following options, which is the correct order to complete the tasks?

A) 

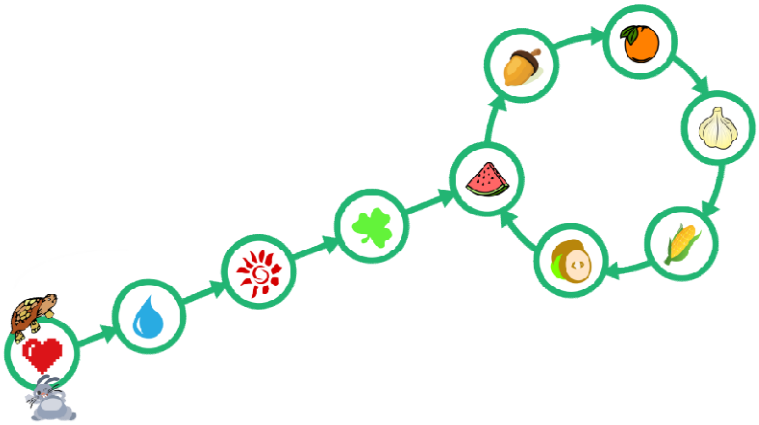
B) 

C) 

D) 

T4. TORTOISE AND HARE

A tortoise and a hare are trying to race against each other in the track shown below:



They both start at the same time in the field with a heart in it and they follow the direction of the arrows on the track. The tortoise moves one field every minute. The hare moves two fields every minute.

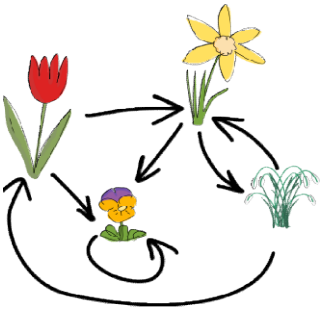
Question / Challenge

What is in the field where the tortoise and the hare meet for the first time after the start?

A) 
B) 
C) 
D) 

T5. SPRING BLOSSOM

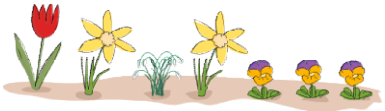
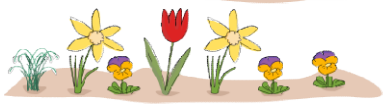
Janine is planting seven flowers from left to right in her flowerbed. She chooses her flowers based on this plan:



She can pick any flower to plant in the leftmost spot in her flowerbed.
She can plant two flowers side by side only ifthe plan shows that there is a single arrow from the flower being planted first to the flower being planted next.
For example, Janine can plant a tulip and then immediately a daffodil because there is an arrow from the tulip leading to the daffodil. However, she cannot plant a daffodil and then immediately plant a tulip because there is no arrow leading in the opposite direction.

Question / Challenge

Which flowerbed **could not** possibly be Janine's?

A) 
B) 
C) 
D) 

T6. BEAVER BADGE

A beaver is making a badge. The shape of the badge is a circle, a triangle, and a square, and the letters on the badge are "B", "I", and "T".

The beaver wrote down the instructions, but one of them is wrong.

Question / Challenge

Which of the instructions is written incorrectly?

A) If the letter is "B", the shape is a circle.
B) If the shape is a circle, the letter is "B".
C) If the letter is "I", the shape is not a circle.
D) If the shape is a square, the letter is not "B".

T7. GLUING LOGS!

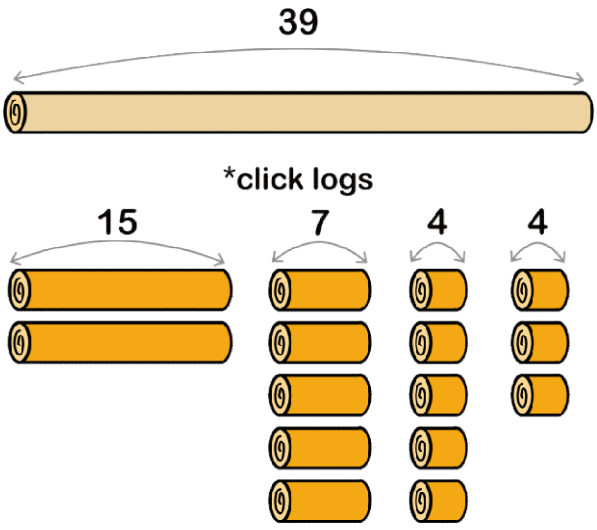
Beavers have to glue several short logs together to make longer logs of a certain length.

Gluing logs is time-consuming, so beavers should use as few logs as possible, and beavers should not cut any logs.

Question / Challenge

Given the following logs, how many logs can be glued together to make a log of length 39? Find the minimum number of logs you need.

Available logs: There are 2 logs of size 15, 5 logs of size 7 and 8 logs of size 4.

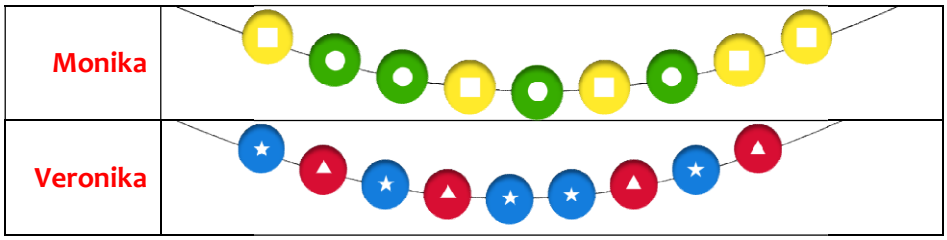


A) 5 logs **B)** 6 logs **C)** 7 logs **D)** 8 logs

TASKS T8 – T14 CARRY 4 POINTS EACH

T8. OHRID PEARLS

Monika and Veronika brought necklaces back from their holidays.

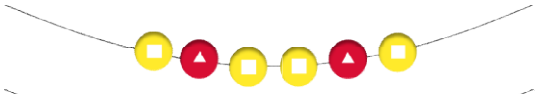


They used six of their pearls to make a new necklace for their friend Anastasija. Now their necklaces look like this.

Question / Challenge

Which is Anastasija's necklace?

A) 

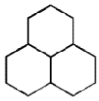
B) 

C) 

D)

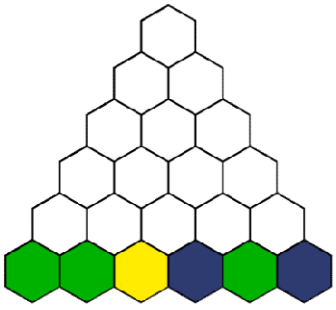
T9. COLORFUL TOWER

Sam has hexagonalpuzzle pieces in three colors. When he places three pieces as shown, the three pieces must all be the same color or all different colors.



Question / Challenge

Sam places pieces in a tower shape as shown below. What must the top piece be?



A)

B) 

C) 

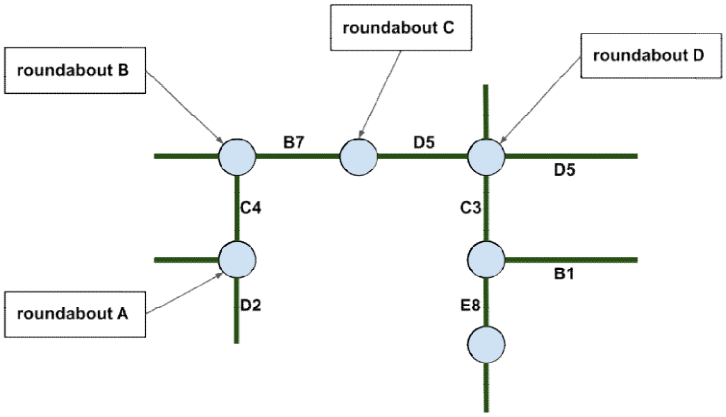
D) there is more than one possibility

T10. MAP ERROR

We have a verbal description of the route from the GPS navigation:

- take the D2 road, take the first exit at the roundabout
- follow the road C4, take the first exit at the roundabout
- after 7 kilometres on the B7 road you come to a roundabout, take the second exit
- follow the road D5, take the first exit at the roundabout
- continue on road C3, take the second exit
- after 4 kilometres on road B1 you will reach your destination

and an older schematic map:



Question / Challenge

At which roundabout are not all exits drawn on the map?

A) at the roundabout A
B) at the roundabout B
C) at the roundabout C
D) at the roundabout D

T11. HEART GRAPHICS

Tina started with one circle and one square:

Then she created this heart:

Tina only used these kinds of operations on shapes:

Rotate: Rotate the shape by any amount in either direction
Move: Move the shape anywhere
Duplicate: Create a copy of the shape at the same location

Question / Challenge

Which of the following sequence of operations could Tina have used?

A) Duplicate circle. Rotate square. Move circle. Move circle.
B) Duplicate square. Rotate square. Move square. Move circle.
C) Duplicate circle. Rotate circle. Move circle. Move square.
D) Move circle. Move circle. Duplicate circle. Move square.

T12. COLOURFUL CANDLES

Simon owns candles in the shape of the numerals 0 to 9. There are two of each numeral. The candles come in three colours: orange, red, and blue. All 0 candles are orange, all 1 candles are red, and so on (see table). Each year for his birthday, Simon places two of the candles on his cake to spell out his new age.

Number	Colour
0	Orange
1	Red
2	Blue
3	Orange
4	Red
5	Blue
6	Orange
7	Red
8	Blue
9	Orange

This year Simon turned 47 years old and used two red candles to spell out his age.

Question / Challenge

How many years will pass before Simon places two candles of the same colour on his birthday cake again?

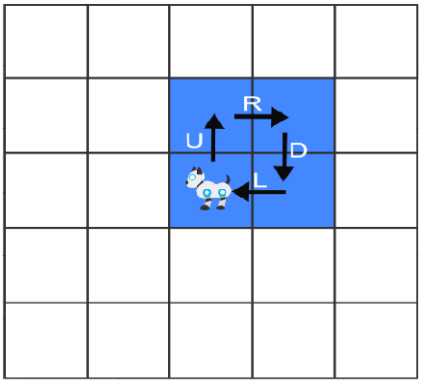
A) 3 **B)** 4 **C)** 5 **D)** 6

T13. MOVING AROUND

A robot moves on a grid, from field to field, and is controlled by these commands:

L – Left, **R –** Right, **U –** Up, **D –** Down

When executing a command sequence, the robot always starts in the middle field of the grid.
For example, see the command sequence **URDL.** This sequence will make the robot return to its starting field.



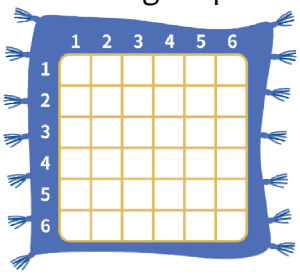
Question / Challenge

Which of these command sequences will make the robot return to its starting field as well?

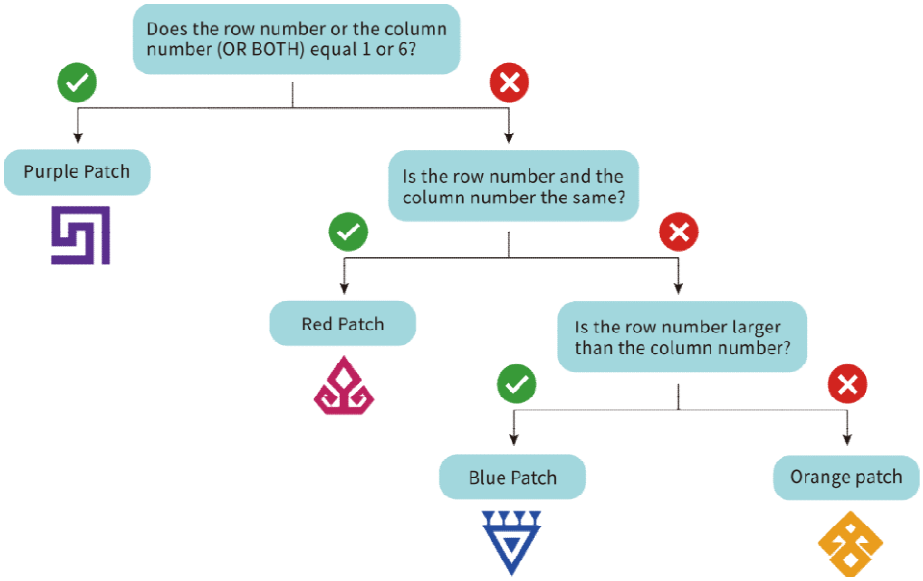
A) ULDDRRUR **B)** DDRUURUL **C)** ULDDRRUL **D)** LURRRDLD

T14. RUG WEAVING

Hale is a Turkish weaving artist. She is making a square rug with 6 rows and 6 columns.



Hale puts a symbol in each square on the grid of the rug using the following questions:



Question / Challenge

Using this method, what would the resulting rug look like?

A) 

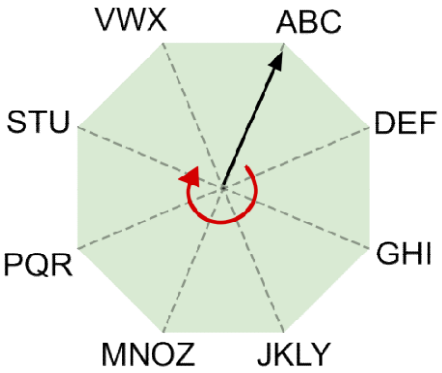
B) 

C) 

D) 

TASKS T15 – T21 CARRY 5 POINTS EACH

T15. CIPHER 8



In the vertices of the octagon we have written three or four letters. An arrow points from the center of the octagon to a letter group. The arrow can rotate clockwise. We encrypt messages using this octagon and arrow.

At the beginning of the encryption of a **new message**, the arrow always points to the letters ABC.

We encrypt each letter of the message so that:

- The **first number** means how many vertices of the octagon the arrow should be rotated from its current rotation
- The **second number** means the position of the encrypted letter in the letter group to which the arrow points

- The encrypted letters are **separated** by a "-"

For example, the message TREE is encrypted with the sequence 62-73-42-02

Question / Challenge

How do we encrypt the message WATER?

A) 72-11-26-32-53 **B)** 62-11-62-22-43 **C)** 62-11-26-22-53 **D)** 72-11-62-32-43

T16. DOMINOS

Domino tiles consist of two sides with 0 to 6 dots on each side.
In a game of dominos it is possible to make a row of tiles by placing them end-to-end, so long as the touching ends have the same number of dots. A player is allowed to flip the domino tiles around to achieve this.

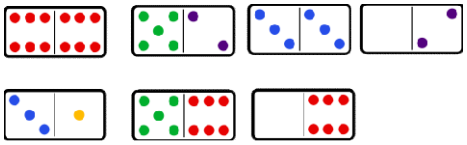
Example:

The row above could be increased to 3 dominos by:

- adding another domino with six dots on one side to the left.
- adding another domino to the right that has one side with no dots.

Question / Challenge

Given the seven domino tiles below, what is the longest row of tiles achievable?

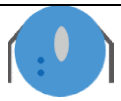
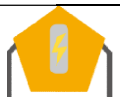


A) 3 **B)** 4 **C)** 5 **D)** 6

T17. ROBOT FACTORY

A factory in Beaver city makes robots that can do household chores.
Robots have one head design, one body design, and one leg design. For each robot there are 3 different heads, 4 different bodies and 3 different sets of legs to choose from.
An automatic machine builds the robots, choosing the parts (head, body, legs) according to these lists:

Head	 blue→	 green →	 orange	(repeats again)

Body	 circle →	 square →	 triangle →	 pentagon	(repeats again)

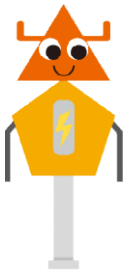
Legs	 two legs →	 four legs →	 one leg	(repeats again)

Each day the machine starts the same - the first robot is combined from a blue head, circle body and two legs.

Last night there was a power outage at the factory that caused the machine to malfunction and change. The machine still makes the first robot as usual. But the machine now follows a new pattern. Instead of choosing the next part in each list:

- For robot head and legs – the machine skips ahead one part in the original list.
- For robot body – the machine skips ahead two parts in the original list.

For example, the 2nd robot made looks like this:

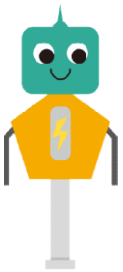


Question / Challenge

The workers at the factory realized the machine was broken and turned it off after the 10th robot. What did this 10th robot look like?

A)

B)



C)

D)

T18. STRING FUNCTION

There are two kinds of machines in the stone factory. When we put an arrangement of the stones into these machines from the left hand side, they will remove some stones and put out specific arrangements of the stones on the right:

The blue machine is called an "odd machine", which puts out stones in the odd places and remove every second stones, just like the picture below:

The brown machine with a number "n" on it is called a "trim machine". It removes the first and last "n" stones, and puts out whichever stones that are left. The picture below shows how a trim machine with the number "3" on it works:

These two machines can be combined, and the output of the first machine will be the input of the second machine.

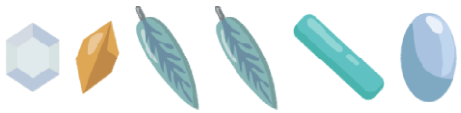
Question / Challenge

If the stones are arranged and put into the machine like the picture below, what will be the output?

A) 

B) 

C) 

D) 

T19. ANCIENT RUNES

The ancient runes were partially decoded by Professor Challenger before his mysterious disappearance. You have found the page below from his note book.

A	B	C	D	E
F	G	H	I	J
K	L	M	N	O
P	Q	R	S	T
U	V	W	X	Y
Z				

I = 

V = 

Question / Challenge

Which of the following can be decoded as "BAT"?

A) 

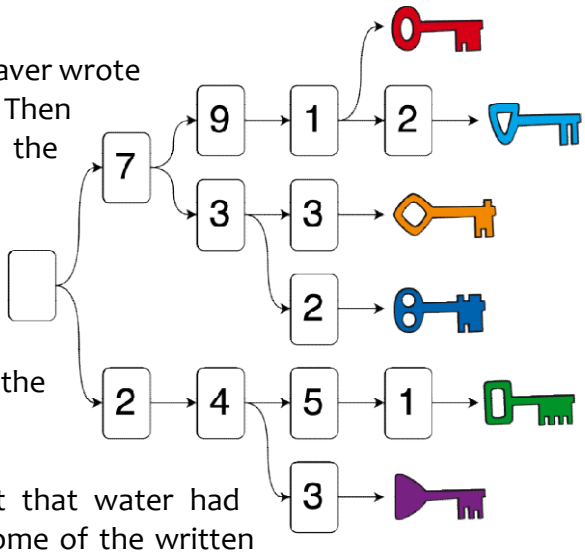
B) 

C) 

D) 

T20. POOL PARTY LOCKERS

The Beavers are going to a pool party!
After putting their valuables in lockers, each beaver wrote down his locker number on a sheet of paper. Then they entrusted both the key and this sheet to the Old Beaver for safekeeping.
Old Beaver split the given locker numbers into digits and made the picture. For example, for the locker number 243 the Old Beaver draws the digits 2, 4, and 3 one by one and then connects the digits to the purple key (see at the bottom of the picture).



Later in the evening, the beavers found out that water had gotten on the sheet of paper and smudged some of the written digits.

Question / Challenge

Knowing that the keys for locker numbers 73X, 24XX, 7X1X are arranged in order, which one of the following sets of keys is the correct set for these lockers?

A) 

B) 

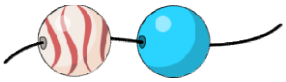
C) 

D) 

T21. SAILOR NECKLACE

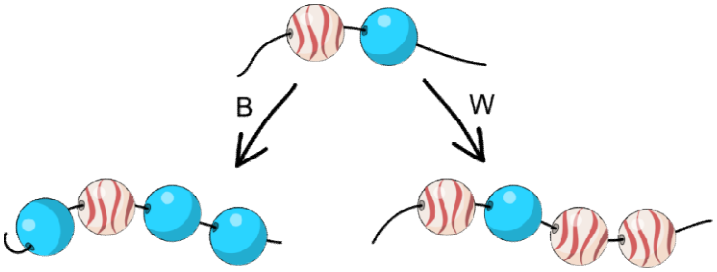
Here are instructions for making a sailor necklace using wavy white beads and solid blue beads.

Every sailor necklace starts by placing one wavy bead and one blue bead on a string in the order shown:



The sailor necklace can then be made longer by either:

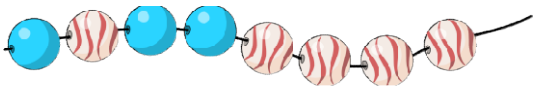
- adding a blue bead to both ends of the string (action B)
- or adding two wavy beads to the rightmost end of the string (action W)

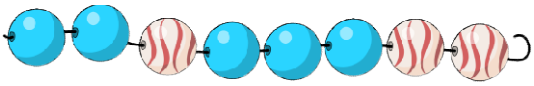


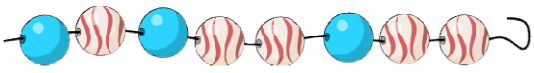
These actions can be done multiple times in order to build longer and longer necklaces.

Question / Challenge

Which necklace below is **not** a sailor necklace?

A) 

B) 

C) 

D)